

CLAIMS:

1. A bonding composition for tooth tissue, comprising:

a mixture of a polymerizable compound having acid group, a water-soluble film-forming agent, water, and a curing agent;

5        wherein a calcium salt formed from said polymerizable compound having an acid group is insoluble in water;

wherein said film-forming agent is a polymerizable compound; and

wherein said film-forming agent is miscible with a physiological saline solution.

10        2. The bonding composition according to Claim 1, wherein the polymerizable compound having an acid group is a vinyl compound.

15        3. The bonding composition according to Claim 2, wherein said acid group is a phosphoric acid group or a carboxyl group.

20        4. The bonding composition according to Claim 3, wherein said vinyl compound having a phosphoric acid group is selected from the group consisting of a (meth)acryloyloxyalkyl phosphate, a di(meth)acryloyloxyalkyl phosphate, a(meth)acryloyloxyalkylaryl phosphate, a (meth)acryloyloxyalkylaryl phosphonate, a (meth)acryloyloxyalkyl thiophosphate, a di(meth)acryloyloxyalkyl thiophosphate, a (meth)acryloyloxyalkylaryl thiophosphate, a (meth)acryloyloxyalkylaryl thiophosphonate and mixtures thereof.

5. The bonding composition according to Claim 3, wherein said vinyl compound

having a carboxylic acid group is selected from the group consisting of a

(meth)acryloyloxyalkoxycarbonylphthalic acid, a

(meth)acryloyloxyalkoxyalkoxycarbonylphthalic acid, a dicarboxylic acid, an anhydride of

(meth)acryloyloxyalkoxycarbonylphthalic acid, an anhydride of

5 (meth)acryloyloxyalkoxyalkoxycarbonylphthalic acid, an anhydride of dicarboxylic acid, and mixtures thereof.

6. The bonding composition according to Claim 1, wherein an amount of said polymerizable compound having an acid group is between 0.1 and 50% by weight per 100%  
10 by weight of said bonding composition.

7. The bonding composition according to Claim 1, wherein said film-forming agent is selected from the group consisting of a (meth)acrylate, an acrylamide, a crotonate, a  
15 cinnamate and mixtures thereof.

8. The bonding composition according to Claim 7, wherein said (meth)acrylate has a hydrophilic group selected from the group consisting of a hydroxyl group, a carbonyl group, an amino group, an ammonium salt group, a phosphonium salt group, a sulfonic acid salt  
20 group, an ether bond, a cyclic ether group and an acyl group.

9. The bonding composition according to Claim 1, wherein said film-forming agent is a polymerizable compound comprising 2-hydroxyethyl methacrylate.

10. The bonding composition according to Claim 1, wherein said film-forming agent

comprises a hydrophilic monomer, a monofunctional (meth)acrylate and/or a polyfunctional (meth)acrylate.

11. The bonding composition according to Claim 10, wherein a blend ratio of said monofunctional (meth)acrylate and/or said polyfunctional (meth)acrylate is 0.1-40 parts by weight of a total weight of said bonding composition.

12. The bonding composition according to Claim 1, wherein said curing agent is a polymerization initiator or a mixture of a polymerization initiator and a polymerization promoter.

13. The bonding composition according to Claim 12, wherein said polymerization initiator is selected from the group consisting of a photo-polymerization initiator, a thermal polymerization initiator and mixtures thereof.

14. The bonding composition according to Claim 12, wherein said polymerization initiator is soluble in water.

15. The bonding composition according to Claim 12, wherein said polymerization initiator is selected from the group consisting of an  $\alpha$ -diketone, a ketal, an anthraquinone, a thioxanthone, a benzoin alkyl ether, an acylphosphine oxide and mixtures thereof.

16. The bonding composition according to Claim 12, wherein said thermal polymerization initiator is selected from the group consisting of a diacyl peroxide, a peroxy

ester, a dialkyl peroxide, a peroxy ketal, a ketone peroxide, a hydroperoxide and mixtures thereof.

17. The bonding composition according to Claim 12, wherein said polymerization  
5 promoter is selected from the group consisting of an amine, a sulfinic acid, a salt of an amine, a salt of a sulfinic acid and mixtures thereof.

18. The bonding composition according to Claim 1, wherein an amount of said curing agent is between 0.05 and 20% by weight per 100% by weight of said bonding composition.

19. The bonding composition according to Claim 1, further comprising a form-  
retaining agent.

20. The bonding composition according to Claim 19, wherein said form-retaining agent is selected from the group consisting of a sand balloon, a glass balloon, a short glass fiber, a pieces of hollow glass fiber, a glass bead, glass powder, powder of a natural mineral, beads of a cross linked polymer, flakes of a cross linked polymer and an organic/inorganic composite material containing a cross linked polymer.

21. The bonding composition according to Claim 19, wherein said form-retaining agent is a particle.

22. The bonding composition according to Claim 21, wherein the mean particle size of said particle is between 1 and 300 micron.

23. The bonding composition according to Claim 19, wherein said form-retaining agent is a cross-linked polymer particle.

24. The bonding composition according to Claim 19, wherein an amount of said form-retaining agent is between 0.5 and 20% by weight per 100% by weight of said bonding composition.

25. The bonding composition according to Claim 1, wherein a pH value of an aqueous 1 weight % solution of said polymerizable compound having an acid group is between 1.8 and 2.5.

26. The bonding composition according to Claim 1, wherein said composition is a rapidly-curable liquid.